

① Find the slope between  $(3, 4)$  and  $(6, -4)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow \frac{-4 - 4}{6 - 3} = \frac{-8}{3}$$

② Find the equation of a line through the points in problem #1.

$$y = m(x - x_1) + y_1$$

$$y = -\frac{8}{3}(x - 3) + 4$$

OR  $y = -\frac{8}{3}(x - 6) - 4$

③ Solve for  $x$

$$3 \cdot 7 = 5 \cdot x \quad \frac{3}{5} = \frac{x}{7}$$

$$\frac{21}{5} = \frac{5x}{5} \quad \boxed{x = 4.2}$$

$$\frac{x+1}{3} = \frac{x+2}{2}$$

$$4(x+1) = 3(x+2)$$

④ Find the standard deviation of the data set  $3, 5, 7, 3, 2$

$x$	$x - \bar{x}$	$(x - \bar{x})^2$
3	-1	1
5	1	1
7	3	9
3	-1	1
2	-2	4

$$\bar{x} = 4$$

$$\text{avg} = 3.2$$

$$\sigma = \sqrt{3.2} \approx 1.788$$

$$4x + 4 = 3x + 6$$

$$4x = 3x + 2$$

$$\boxed{x = 2}$$

# Homework 13

# Deviations

1. Find the mean and the standard deviation of this set of data.

$$24, 25, 15, 19, 17 \quad \bar{x} = 20 \quad \sigma = 3.89$$

Your task in the rest of this assignment is to make up new sets of data items, each having either the same mean or the same standard deviation as the data set in Question 1.

If you can, do these problems without actually calculating the mean or the standard deviation of each new set of data, and explain how you know without calculating that the data set fits the conditions.

2. Make up a set of five data items that has the *same mean* as the data set in Question 1 but has a *smaller standard deviation*.

$$20, 20, 20, 20, 20 \quad \bar{x} = 20 \quad \sigma = 0$$

3. Make up a set of five data items that has the *same mean* as the data set in Question 1 but has a *larger standard deviation*.

$$80, 5, 5, 5, 5 \quad \bar{x} = 20 \quad \sigma = 30$$

4. Make up a set of five data items that has the *same standard deviation* as the data set in Question 1 but has a *different mean*.

④

42	7	49	
40	5	25	
36	1	1	76
36	1	1	Average = 15.2
35	0	0	$\sqrt{\quad} = 3.899$

mean = 35



2600	2604	2607	2610	2612	2615	2616
2617	2618	2619	2623	2623.5	2624	2625
2626	2627	2630	2631	2636	2637	

Handwritten annotations:   
 - 2620 is circled with an arrow pointing to 2619, labeled "mean".   
 - 2621.5 is circled with an arrow pointing to 2623, labeled "median".   
 - 2623.5 is circled.   
 - 2624 is circled.

1. Given this information, what do you think is the best estimate for the weight of a penny, and why?
2. Sarah's and Tom's Uncle Jack claimed that he had a counterfeit penny. Sarah and Tom didn't believe it was counterfeit, because it looked real and felt real and because their uncle was always trying to fool them. They asked him if they could borrow the penny, and they weighed it. They got 2641 milligrams.

Tom said the coin must be counterfeit because they never got a weight that high with their other pennies. Sarah isn't sure. She thinks that if they weighed it again, its weight might be closer to that of the weight of the others. Or, if they measured more pennies, then Uncle Jack's coin might not seem so weird. What do you think, and why? If you don't think Uncle Jack's penny is counterfeit, then how heavy or light would a penny need to be before you believed it



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odd  
might be  
✓ Not counterfeit  
only 4mg higher

2600	2604	2607	2610	2612	2615	2616
2617	2618	2619	2623	2623	2624	2625
2626	2627	2630	2631	2636	2637	

L. Compute the

2600	2604	2607	2610	2612	2615	2616
2617	2618	2619	2623	2623	2624	2625
2626	2627	2630	2631	2636	2637	

1. Compute the mean and standard deviation of these weights. Record all

$$\bar{x} = 2620$$

